Amendments to the Specification:

Please replace the paragraph beginning on page 6, line 1, with the following rewritten paragraph:

However, the conventional VCSEL has the following drawbacks. The structure proposed by Grabherr or Aaron will now be described in more detail with reference to Figs. 10A and 10B. Fig. 10A shows a case whether an oxide-confined aperture 705 is positioned at the loop position at which the maximum electric field of a standing wave 713 of laser light is available. Fig. 10B shows another case where the oxide-confined aperture 705 is positioned at the node position at which the minimum electric field of the standing wave 713 is available. The VCSEL devices shown in Figs. 10A and 10B has an n-type GaAs semiconductor layer 701 doped with Si (Nd = 1 x $10^{18}cm^{-3}$), a distributed Bragg reflection (DBR) mirror layer 702 composed of n-type $Al_{0.3}Ga_{0.7}As$ layers and n-type $Al_{0.1}Ga_{0.9}As$ layers that are alternately laminated to a thickness of 40.5 periods, and an undoped λ $Al_{0.2}Ga_{0.8}As$ spacer layer 703 where λ denotes the film thickness and its optical thickness is equal to the wavelength of laser light. A reference numeral 704 indicates a triple quantum well $GaAs/Al_{0.15}Ga_{0.85}As$ active layer in the spacer layer, and a reference numeral 705 is an oxide-confined aperture of a p-type AlAs layer doped with Zn (Na = 7 x $10^{17}cm^{-3}$) formed by oxidizing the circumferential periphery. Layers 703 and 704 form an active region 750. A reference numeral 706 indicates a p-type $Al_{0.9}Ga_{0.1}As$ layer doped with Zn (Na = 7 x $10^{17}cm^{-3}$), and a reference numeral 707 indicates a p-type $Al_{0.3}Ga_{0.7}As$ layer doped with Zn (Na = 1.5 x $10^{18}cm^{-3}$). One pair of layers 706 and 707 forms one period (λ/2) of the p-type DBR layer. A reference numeral 708 indicates a DBR layer composed of p-type $Al_{0.3}Ga_{0.7}As$ layers doped with Zn (Na = 7 x $10^{17}cm^{-3}$) and $Al_{0.9}Ga_{0.1}$ layers that form the laminate starting from the second layer. A reference numeral 709 indicates a p-type GaAs contact layer doped with Zn (Na = 1 x $10^{19}cm^{-3}$), and a reference numeral 710 indicates an interlayer insulation film

made of SiNx. A reference numeral 711 indicates a p-side electrode, and a reference numeral 712 indicates an n-side electrode.

Please replace the paragraph beginning on page 13, line 16, and ending on page 14, line 1, with the following rewritten paragraph:

Fig. 1 is a cross-sectional view of a VCSEL according to a first embodiment of the present invention. Referring to this figure, the VCSEL has an n-type GaAs semiconductor 101 doped with Si (Nd = $1 \times 10^{18} cm^{-3}$) on which a DBR layer 102 and a spacer layer 103 are formed. The DBR layer 102 is a laminate of n-type $Al_{0.3}Ga_{0.7}As$ layers doped with Si (Nd = $1 \times 10^{18} cm^{-3}$) and n-type $Al_{0.9}Ga_{0.1}As$ layers doped with silicon (Nd = $1 \times 10^{18} cm^{-3}$), which layers are alternately laminated one by one to a thickness of 40.5 periods. The spacer 103 is an undoped λ $Al_{0.4}Ga_{0.6}As$ layer where λ denotes the film thickness and its optical thickness is equal to the wavelength of laser light. A triple quantum well $GaAs/Al_{0.15}Ga_{0.85}As$ layer 104 is formed within the spacer layer 103. Layers 103 and 104 form an active region 150.

Please replace the paragraph beginning on page 16, line 5, with the following rewritten paragraph:

Fig. 2 shows a VCSEL according to a second embodiment of the present invention. Referring to this figure, the VCSEL has an n-type GaAs semiconductor 201 doped with Si (Nd = $1 \times 10^{18} cm^{-3}$) on which an n-type DBR layer 202 and a spacer layer 203 are formed. The DBR layer 202 is a laminate of n-type $Al_{0.3}Ga_{0.7}As$ layers doped with Si (Nd = $1 \times 10^{18} cm^{-3}$) and n-type $Al_{0.9}Ga_{0.1}As$ layers doped with silicon (Nd = $1 \times 10^{18} cm^{-3}$), which layers are alternately laminated one by one to a thickness of 40.5 periods. The spacer 203 is an undoped λ $Al_{0.4}Ga_{0.6}As$ layer where λ denotes the film thickness and its optical thickness is equal to the wavelength of laser light. A triple quantum well $GaAs/Al_{0.15}Ga_{0.85}As$ layer 204 is formed within the spacer layer 203. Layers 203 and 204 form an active region 250. On the spacer layer 203, there are provided a p-type $Al_{0.9}Ga_{0.1}As$ layer 205 that is doped with

Zn (Na = 7 x $10^{17}cm^{-3}$) and is λ/8 thick, and a p-type $Al_{0.5}Ga_{0.5}As$ layer 206 that is doped with Zn (Na = 1.5 x $10^{18}cm^{-3}$) and is λ/8 thick. The layer 206 is a low-resistance layer. On the p-type $Al_{0.5}Ga_{0.5}As$ layer 206, there is provided a p-type AlAs layer 207 (Na = 7 x $10^{17}cm^{-3}$), on which a p-type $Al_{0.3}Ga_{0.7}As$ layer 210 doped with Zn (Na = 1 x $10^{18}cm^{-3}$). The four layers of the p-type $Al_{0.9}Ga_{0.1}As$ layer 205, p-type $Al_{0.5}Ga_{0.5}As$ layer 206, p-type AlAs layer 207, and p-type $Al_{0.3}Ga_{0.7}As$ layer 210 form one period of the p-type DBR layer. The sum of the optical thicknesses of the four layers is preferably equal to half the wavelength λ of laser light (λ/2). In order to maintain the reflection performance of the DBR layer, preferably, the sum of the optical thicknesses of the p-type AlAs layer 207 and the p-type $Al_{0.5}Ga_{0.5}As$ layer 206, or the optical thickness of the p-type $Al_{0.5}Ga_{0.5}As$ layer 206 is equal to a quarter of the wavelength λ of laser light (λ/4).

Please replace the paragraph beginning on page 19, line 3, with the following rewritten paragraph:

Referring to Fig. 3, the VCSEL has an n-type GaAs semiconductor 301 doped with Si (Nd = 1 x $10^{18}cm^{-3}$) on which an n-type DBR layer 302 and a spacer layer 303 are formed. The DBR layer 302 is a laminate of n-type $Al_{0.3}Ga_{0.7}As$ layers doped with Si (Nd = 1 x $10^{18}cm^{-3}$) and n-type $Al_{0.9}Ga_{0.1}As$ layers doped with silicon (Nd = 1 x $10^{18}cm^{-3}$), which layers are alternately laminated one by one to a thickness of 40.5 periods. The spacer 303 is an undoped λ $Al_{0.2}Ga_{0.8}As$ layer where λ denotes the film thickness and its optical thickness is equal to the wavelength of laser light. A triple quantum well GaAs/$Al_{0.15}Ga_{0.85}As$ layer 304 is formed within the spacer layer 303. Layers 303 and 304 form active region 350. A DBR layer 305 is provided on the spacer layer 303. The DBR layer 305 has five periods, each of which is composed of a p-type $Al_{0.9}Ga_{0.1}As$ doped with Zn (Na = 7 x $10^{17}cm^{-3}$) and a p-type $Al_{0.3}Ga_{0.7}As$ doped with Zn (Na = 7 x $10^{17}cm^{-3}$). On the DBR layer 305, there is

provided a p-type $Al_{0.5}Ga_{0.5}As$ layer 306 that is doped with Zn (Na = 1.5 x $10^{18}cm^{-3}$) and is $\lambda/4$ thick. On the p-type layer 306, there is provided a p-type AlAs layer 307 doped with Zn (Na = 7 x $10^{17}cm^{-3}$). On the p-type layer 307, there is provided a p-type $Al_{0.3}Ga_{0.7}As$ layer 310 doped with Zn (Na = 1.5 x $10^{18}cm^{-3}$). The three layers of the p-type $Al_{0.5}Ga_{0.5}As$ layer 306, p-type AlAs layer 307, and the p-type $Al_{0.3}Ga_{0.7}As$ layer 310 form one period of the p-type DBR layer 305. The sum of the optical thicknesses of the three layers is preferably equal to half the wavelength λ of laser light ($\lambda/2$). In order to maintain the reflection performance of the DBR layer, preferably, the sum of the optical thicknesses of the p-type AlAs layer 307 and the p-type $Al_{0.5}Ga_{0.5}As$ layer 306, or the optical thickness of the p-type $Al_{0.5}Ga_{0.5}As$ layer 306 is equal to a quarter of the wavelength λ of laser light ($\lambda/4$).

Please replace the paragraph beginning on page 21, line 19, with the following rewritten paragraph:

Referring to this figure, the VCSEL has an n-type GaAs semiconductor 401 doped with Si (Nd = 1 x $10^{18}cm^{-3}$) on which an n-type DBR layer 402 and a spacer layer 403 are formed. The DBR layer 402 is a laminate of n-type $Al_{0.3}Ga_{0.7}As$ layers doped with Si (Nd = 1 x $10^{18}cm^{-3}$) and n-type $Al_{0.9}Ga_{0.1}As$ layers doped with silicon (Nd = 1 x $10^{18}cm^{-3}$), which layers are alternately laminated one by one to a thickness of 40.5 periods. The spacer 403 is an undoped λ $Al_{0.2}Ga_{0.8}As$ layer where λ denotes the film thickness and its optical thickness is equal to the wavelength of laser light. A triple quantum well GaAs/$Al_{0.15}Ga_{0.85}As$ layer 404 is formed within the spacer layer 403. <u>Layers 403 and 404 form an active region 450.</u> A DBR layer 405 is provided on the spacer layer 403. The DBR layer 405 has five periods, each of which is composes of a p-type $Al_{0.9}Ga_{0.1}As$ doped with Zn (Na = 7 x $10^{17}cm^{-3}$) and a p-type $Al_{0.3}Ga_{0.7}As$ doped with Zn (Na = 7 x $10^{17}cm^{-3}$). On the DBR layer 405, there is provided a p-type $Al_{0.9}Ga_{0.1}As$ layer 406 that is doped with Zn (Na = 7 x $10^{17}cm^{-3}$) and is $\lambda/8$

thick. On the p-type layer 406, there is provided a p-type $Al_{0.5}Ga_{0.5}As$ layer 407 doped with Zn ($Na = 7 \times 10^{17}cm^{-3}$). On the p-type layer 407, there is provided a p-type AlAs layer 408 on which there is provided a p-type $Al_{0.3}Ga_{0.7}As$ layer 411 doped with Zn ($Na = 1.5 \times 10^{18}cm^{-3}$). The four layers of the p-type $Al_{0.9}Ga_{0.1}As$ layer 406, p-type $Al_{0.5}Ga_{0.5}As$ layer 407, p-type AlAs layer 408 and the p-type $Al_{0.3}Ga_{0.7}As$ layer 411 form one period of the p-type DBR layer. The sum of the optical thicknesses of the four layers is preferably equal to half the wavelength λ of laser light ($\lambda/2$). In order to maintain the reflection performance of the DBR layer, preferably, the sum of the optical thicknesses of the p-type AlAs layer 408 and the p-type $Al_{0.5}Ga_{0.5}As$ layer 407, or the optical thickness of the p-type $Al_{0.5}Ga_{0.5}As$ layer 407 is equal to a quarter of the wavelength λ of laser light ($\lambda/4$).

Please replace the paragraph beginning on page 24, line 1, with the following rewritten paragraph:

Referring to Fig. 5, the VCSEL has an n-type GaAs semiconductor 501 doped with Si ($Nd = 1 \times 10^{18}cm^{-3}$) on which an n-type DBR layer 502 and a spacer 503 are formed. The DBR layer 302 is a laminate of n-type $Al_{0.3}Ga_{0.7}As$ layers doped with Si ($Nd = 1 \times 10^{18}cm^{-3}$) and n-type $Al_{0.9}Ga_{0.1}As$ layers doped with silicon ($Nd = 1 \times 10^{18}cm^{-3}$), which layers are alternately laminated one by one to a thickness of 40.5 periods. The spacer 503 is an undoped λ $Al_{0.2}Ga_{0.8}As$ layer where λ denotes the film thickness and its optical thickness is equal to the wavelength of laser light. A triple quantum well $GaAs/Al_{0.15}Ga_{0.85}As$ layer 504 is formed within the spacer layer 503. Layers 503 and 504 form an active region 550. On the spacer layer 503, there is provided a first low-resistance layer 506, which is a p-type $Al_{0.5}Ga_{0.5}As$ layer doped with Zn ($Na = 1.5 \times 10^{18}cm^{-3}$). On the first low-resistance layer 506, there is provided a p-type AlAs layer 507 doped with Zn ($Na = 7 \times 10^{17}cm^{-3}$). On the layer 507, there is provided a second low-resistance layer 508, which is a p-type $Al_{0.2}Ga_{0.8}As$ layer doped with Zn ($Na = 2 \times 10^{18}cm^{-3}$). One period of a p-type DBR layer is composed of the first low-

resistance layer 506 of p-type $Al_{0.5}Ga_{0.5}As$, p-type AlAs layer 507, and the second low-resistance layer 508 of p-type $Al_{0.2}Ga_{0.8}As$. The sum of the optical thicknesses of the three layers is preferably equal to half the wavelength λ of laser light ($\lambda/2$). In order to maintain the reflection performance of the DBR layer, preferably, the sum of the optical thicknesses of the p-type AlAs layer 507 and the p-type $Al_{0.5}Ga_{0.5}As$ layer 506, or the optical thickness of the p-type $Al_{0.5}Ga_{0.5}As$ layer 506 is equal to a quarter of the wavelength λ of laser light ($\lambda/4$). On the p-type $Al_{0.2}Ga_{0.8}As$ layer 508, a DBR layer 512 of p-type $Al_{0.9}Ga_{0.1}As$ layers doped with Zn ($Na = 7 \times 10^{17} cm^{-3}$) and p-type $Al_{0.3}Ga_{0.7}As$ layers doped with Zn ($Na = 7 \times 10^{17} cm^{-3}$), which layers are alternately laminated one by one to a thickness of 20.5 periods. A p-type GaAs contact layer 513 doped with Zn ($Na = 1 \times 10^{19} cm^{-3}$) is formed on the p-type DBR layer 512. The Al composition ratio of the layer of the first period of the p-type DBR layer is lower than that of the subsequent layers of the p-type DBR layer located above the p-type AlAs layer 507.